

Odyssey of the Eyes

Intermediate Level



Purpose

To familiarize students with the concept of modeling as it is related to remote sensing and to introduce students to the process of digitizing pictures similar to the ones produced by a satellite's remote sensing equipment

Overview

In this intermediate level activity, *Odyssey of The Eyes* students will use the symbolic map created in the beginning activity to produce a digitized photo similar to the ones produced by a satellite's remote sensing equipment. As they perform the activity they will begin to see why ground verification of satellite data is necessary in order for scientists to create accurate models of the Earth's systems.

Time

Three to four class periods

Level

Intermediate

Key Concepts

Objects in a remotely sensed image are interpreted and digitized into a code based upon the object's reflectance of bands of light.

The image codes are relayed through a satellite dish to a computer for storage or enhancement.

Image display is accomplished by conversion of stored data to a user-defined color-coded image.

Skills

Observing an image
Interpreting an image
Classifying an image
Digitizing an image
Coloring an image

Note: This activity presents concepts similar to those in steps 8, 9, and 10 of the *Relative and Absolute Directions Learning Activity* in the *GPS Investigation*.

Materials and Tools

Graph paper
Pencils
Plastic overlay with grid
Image of the Panda Bear
Colored pencils

Preparation

Assemble the materials.

Demonstrate the process of digitizing to the class before you have students work with partners.

Prerequisites

Students should be briefed on the process by which satellites receive their information and relay it to computer.

The beginning activity is necessary for the completion of this activity.

What To Do and How To Do It

Part 1: How Digitized Pictures Are Made

Students will learn how satellites and computers communicate with each other. One student will serve as the satellite and the other will represent the computer. Using a black and white image, the satellite will scan the image translating it into a digitized code. The computer will translate the numeric code reproducing the image.

1. Students work in pairs. One serves as the satellite and the other represents the computer. The satellite places the plastic overlay over the black and white of the Panda Bear and scans the image one box at a time, starting at the left hand corner of the image. The satellite calls out a number code for each box to the computer.
2. The satellite will interpret each square according to the following guidelines:
 - If a box is white the satellite interprets the message as a “1” and the computer writes that number in the code.
 - If a box is black the satellite interprets the message as a “2” and the computer writes that number in the code.
 - If a box is neither all black nor all white the satellite must make a decision as to the best possible choice, “1” or “2”. The satellite communicates that number to the computer and the computer writes it down in the code.
 - The satellite indicates the beginning and end of each scan line with a “0”.
3. Using a pencil, the student representing the computer translates the digital code onto the graph paper creating a satellite image.

Note: See the digital code in the advanced level of this activity for an example. Additional practice can be had using student generated color pictures and different size grids.

Part 2: Making a Digitized Map

1. Supply each group with a plastic grid overlay. Have the students place this grid over their symbolic map from the beginning activity. They will now have to create a color and number code for the land cover items. They are to place the data on the Odyssey of the Eyes Digitized Data Sheet (found after *Odyssey of the Eyes: Advanced Level*).
2. Assign each land form on the symbolic map a color and a number. Record this on the Digitized Data Sheet.

Ex.	buildings	1	blue
	trees	2	green

3. Scan each line of the symbolic map matching each square with a number. Record the numbers on the data chart. Begin and end each scan line with a “0”. Review the guidelines in part one of this activity for further assistance. You have created a digital code for your symbolic map.
4. Using the digitized code, select the matching colors and reproduce the map as a digitized image on a piece of graph paper.

Discussion Questions

1. How different are the proportions of land cover types as compared to their symbolic map?
2. How different are the proportions of land cover types as compared to their original model?
3. Compare and contrast maps produced by different groups:
 - How do you know the maps are accurate?
 - What happens to land cover types that are small in area when you draw a symbolic map or digitize an image?
 - How do these changes affect what type and amount of land cover you see?

Note: Ground verification is what you are doing in some of the protocols. It is checking what is actually on the ground compared to what is represented by a satellite image or a model.